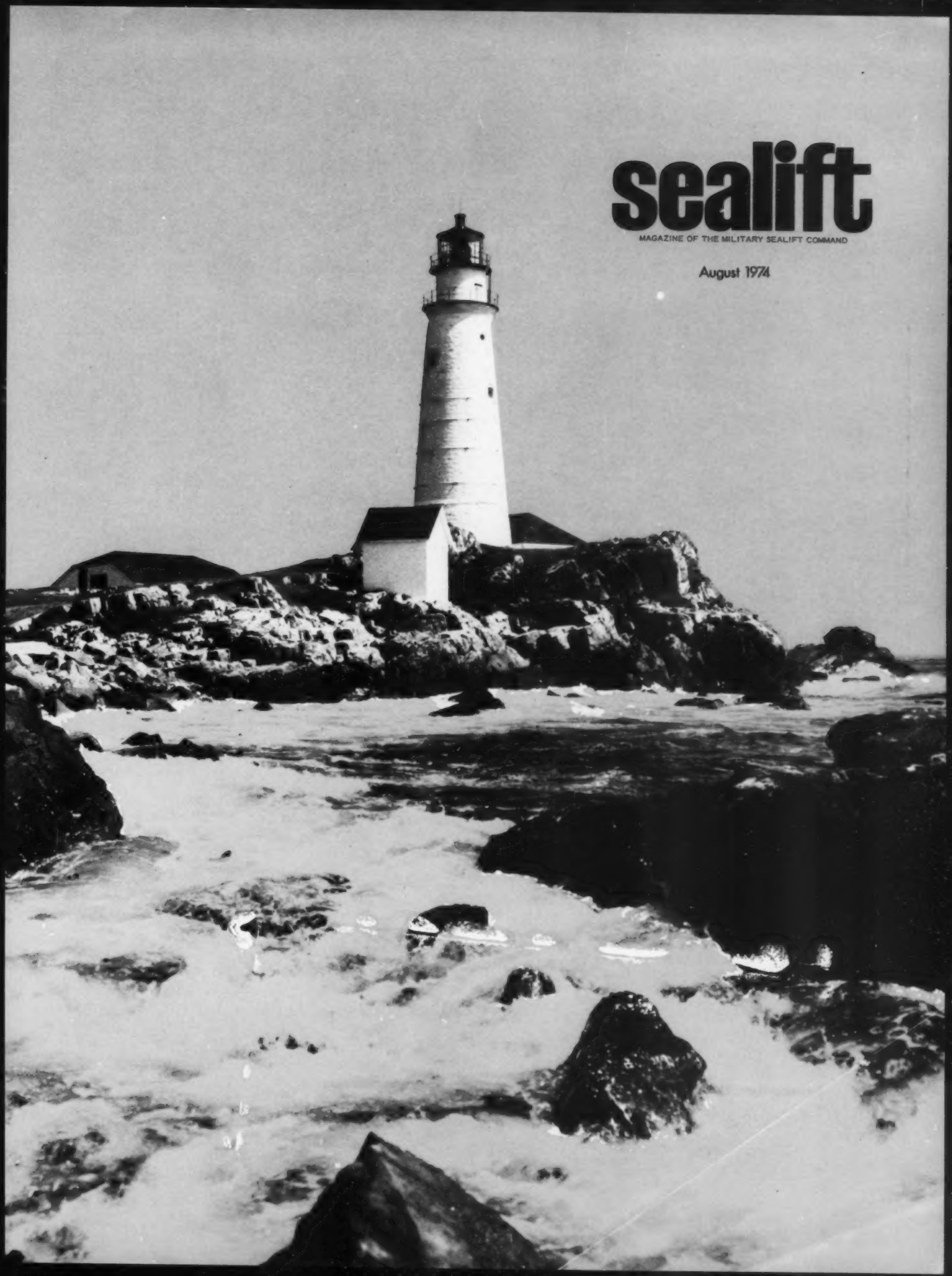

sealift

MAGAZINE OF THE MILITARY SEALIFT COMMAND

August 1974

Notes From Alaska

In June I had my first opportunity to visit MSC's Cool Barge operation in Alaska. I was very much impressed by what I saw and heard, for a number of reasons. One was that Cool Barge is an outstanding example of the worldwide scope of MSC operations. Another is the professional proficiency I saw.

Actually named Cool Barge Pacer Alaska, the operation is usually called simply Cool Barge. It is a program by which MSC resupplies Air Force sites, the DEW Line or Distant Early Warning Line, weather observation stations, communication sites and a number of U.S. agencies in the far north.

The Navy first played a role in this supply effort in 1951, when it was Navy managed. In 1957, the U.S. Army Alaskan Command assumed primary responsibility but it was made an MSC function in 1964. We have been involved ever since.

The contractor responsible for delivery of vital cargo through ice strewn waters where only two ports and a few good beaches exist is the Alaska Puget United Transportation Co., or APUTCO. That company actually is a joint venture. Participants include the Alaska Barge and Transport Co., Puget Sound Tug and Barge Co., and Alaska Puget United Transportation Companies.

While this is a somewhat unique contractual structure, requirements APUTCO fulfills also are unique. Essentially they deliver cargo over the beach—in areas where beaches sometimes rise vertically at the water's edge. Tugs and barges must be maneuvered through dangerous ice between May and September. In a few instances, Army helicopters have been used to lift cargo from a barge and deliver it to an otherwise inaccessible site.

Barges are loaded on the West Coast each year, and towed to Alaska for delivery. In addition to outstanding seamanship, the operation requires effective management for the first cargo on is the last off. There is no time for shifting cargo enroute, and there is little room for error. Winter weather closes the transportation lanes and those who remain at the isolated sites must make do with what they have on hand.

At one time, Cool Barge supplied only military units. Now, agencies served include the Public Health Service, Coast and Geodetic Survey, Bureau of Indian Affairs, the Atomic Energy Commission and a number of others. Altogether, there are more than 40 different sites on the Cool Barge route.

APUTCO employees are fond of describing their activities as "continuing innovation through improvisation." With only two ports along the entire route capable of handling barges at piers, the barges may unload over a rocky beach, or from as much as 13 miles offshore. Unloading is handled by the tug and barge crews who double as seagoing longshoremen.

One reason Cool Barge has been so successful is the management provided by Pacific area command and its Anchorage office. Another is assistance of the Alaskan Air Command. But, most important are the skills, the innovative ability, the courage and dedication of APUTCO employees.

If I might coin a phrase, I'd call them professional jacks-of-all-trades. Each is a specialist with skills developed by years of experience. But their competence extends beyond skills normally expected. Each man can perform every other man's job.

He has to be able to do so for the extremes of weather in which they operate always present dangers, and the type of operation they conduct demands maintenance of tight schedules and near-perfect operations. There is little room for error, and no tolerance for delay, for ice, like time, waits for no man.

As I said at the very beginning, I am very much impressed by APUTCO and the Cool Barge operation. The requirements they fulfill are difficult indeed but the manner in which they perform those demanding tasks reflect great credit on all members of MSC and their fellow merchant mariners.

John D. Chase

Commander, Military Sealift Command

INCORRECT ISSUE NUMBERING SHOULD
READ ISSUE 8

Missed June Sealift ?

Somehow, the distribution center computer which prints Sealift mailing labels skipped almost 600 addresses in June. It was, of course, a human error, but it's impossible to determine who didn't get copies. If you missed the June issue, send a card to the Legislative and Public Affairs Office, Military Sealift Command, Washington, D.C. 20390. We'll mail you your copies.

COVER: America's oldest and most famous lighthouse, Boston light. See story page 4. *Courtesy, U.S. Coast Guard*

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MAGAZINE OF THE MILITARY SEALIFT COMMAND

Vol. XXIV No.9 Washington, D.C. August 1974

Features:

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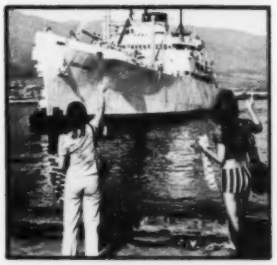
Lighthouses

Since the Revolutionary War, lighthouses have guided ships of all nations, warning them of treacherous shoals and passages.



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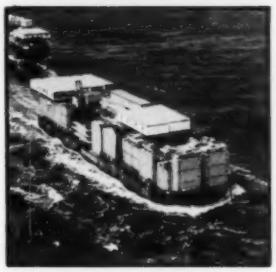
Academy Cruise

Overcoming the oil crisis, California Maritime Academy cadets have a successful training cruise.



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Operation Cool Barge

Navy Lt. Don Curran describes the operation of barges and tugs supporting U.S. defense sites in the Arctic.

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For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Price, 55 cents (single copy). Subscription price, $6.05 per year; $1.55 additional for foreign mailing.

Beacons in the Night

By Louis R. Granger

Immediately following the Revolutionary War, President Washington envisioned a great maritime future for the new nation. He and his immediate successors took realistic measures to protect ships from hidden natural dangers.

Hazards to navigation were numerous. Shifting shoals that could make a natural deep channel a shallow grave

Ocracoke light station in 1893. Light house remains the same, but ground and quarters have changed.

Courtesy, U.S. Coast Guard

Rocks mark the original foundation of the Cape Hatteras light which warns ships of infamous Diamond Shoals.

Photo by Louis Granger

for unsuspecting ships, hidden rocks, inaccurate charts and the ships themselves with no power except the winds made coastwise navigation hazardous as sailing into an unmarked harbor.

The early government made liberal appropriations for lighthouse construction and during the first 50 years after the Revolution 66 lighthouses were built from Maine to Florida and up the Gulf Coast to Louisiana. Ten lighthouses were constructed during Colonial times. The first was erected as a landfall for Boston in 1716.

So important did Washington and the country's early leaders consider these navigation aids, lighthouse keepers were appointed by the President. Washington took an interest in these men and on several occasions he personally reprimanded remiss keepers. The nation's third president, Thomas Jefferson, wrote, "I think the keepers of lighthouses should be dismissed for small degrees of remissness, because of the calamities which even these produce."

The first basic lighthouse law which established the Lighthouse Service was enacted in 1789 by the first Congress. It was the ninth bill passed and provided for the construction of 10 lights, seven unlighted buoys and the immediate construction of a lighthouse on Cape Henry at the entrance to Chesapeake Bay.

Up to this time lighthouse financing was done by local public taxing or by special lotteries. Keepers salaries and expenses were financed by port fees. The Sandy Hook Light, for example, was built with proceeds from a lottery and maintained by a tax on ships.

Responsibility for lighthouse affairs was placed with the Treasury Department under the Revenue Marine Bureau in 1845. In 1852 an autonomous Lighthouse Board was created by Congress, a move that was intended to abolish certain policies that endangered the effectiveness of the navigation aids.

One of the reasons for change was that hiring and firing of keepers had been put into the hands of local tax collectors. These were political appointees and party conscious. Keeper jobs often went to unqualified political friends.

Board chairman was Prof. Henry James, head of the Smithsonian Institution. The board removed local controls from the politicians and divided the nation into 12 lighthouse districts, each with a superintendent. But party politics being stronger than logic, the keepers again became pawns of the party bosses.

This continued until 1896 when, through the efforts of President Cleveland, keepers were placed under Civil Service regulations and were required to take both written and oral examinations.

The board was abolished in 1910 under the endorsement of President Taft and Congress established a Bureau of Lighthouses in the Commerce Department. George R. Putnam, a director of surveys in the U.S. Coast & Geodetic Survey, headed the new bureau and through his devotion to duty and leadership became known as the "father of the lights."

Putnam was responsible for getting pensions for keepers in 1919 and at the time of his retirement in 1935 the bureau had expanded from 12 to 19 districts and the number of navigational aids passed the 20,000 mark.

In 1939 President Franklin D. Roosevelt placed navigation aids under Coast Guard jurisdiction and closed the lighthouse bureau.

This action came as a surprise and there was much apprehension about turning over a civilian operated bureau to a military organization. However, the Coast Guard was sympathetic to its new civilian employees, allowing them to stay on and putting them under the Coast Guard Retirement law which offered even better benefits than before.

There were other benefits as well. The bureau was a penny-pinching agency and the result was that equipment was run-down and obsolete. A modernization program began and has continued in an unending effort to improve aids to navigation and increase their number where and when needed.

In 1939 there were approximately 29,000 aids to navigation. Today there are more than 46,900 aids not including LORAN, or long range navigation through a system of radio signals, and RACON which sends out

radar beacons up to 120 miles to ships and aircraft.

As of Dec., 31, 1973, these aids included 25,291 buoys, 3,927 of them lighted; 11,864 unmanned lights not including the buoys; 8,845 day beacons (channel markers), and 156 manned lights including lighthouses, off-shore towers and lightships. In addition to the Coast Guard aids, there were 31,047 private aids to navigation requiring Coast Guard approval. This group includes markers indicating private channels to piers and docks, and floating navigational aids for offshore oil rigs.

In recent years the number of lightships has been steadily decreasing. These are being replaced by large offshore towers and 40-foot tall sea buoys. Currently four lightships are on station and by the end of next June two are tentatively scheduled to be replaced by buoys. Lightships are located at Boston; Nantucket; Portland, Maine, and Astoria, Oregon. Sea buoys will replace the Boston and Portland vessels. In addition, there are two relief lightships at Boston and Seattle. They go into service when other lightships go into port for maintenance.

In fiscal 1968 the Coast Guard began operation LAMP, a long-range program to automate about 150 manned lighthouses. About 70 remain in the program although a few originally scheduled for automation have been removed from the list for various reasons including historical considerations. Daily maintenance of lights easily accessible to the public will keep them more attractive, a Coast Guard spokesman said. Potential vandalism is another reason for keeping lighthouse keepers on the premises.

During the current fiscal year the Coast Guard will start the usual three-year automation period for three lights, The Graves off the Boston Harbor entrance; Egg Rock Light off the Maine coast, and Falkner Island on Long Island Sound.

America's past—its wars, storms and its achievements —are deeply inscribed in the history of lighthouses.

The first lighthouse established in America was on Little Brewster Island in Boston Harbor. It was first lighted Sept. 14, 1716. A tax of one penny a ton on all vessels except coasters moving in or out of the harbor paid for maintaining the light.

George Worthylake, the first keeper, also acted as pilot for ships entering the harbor. He, his wife and daughter and two men were drowned when the lighthouse boat capsized on a return trip from Boston.

In 1751 the lighthouse was badly damaged by fire but was repaired. In 1774 the British took over the island and the next year a small detachment of American troops burned the wooden parts of the lighthouse. During its repair General Washington sent 300 men in whaleboats to the island and the repaired work was destroyed. The British left Boston in March 1776 but left a number of ships in the harbor. In June, as American soldiers fired at the fleet, the British sent a boat ashore and blew up the lighthouse before leaving the harbor.

The Massachusetts legislature in 1783 provided funds to erect a new light on the same site. This new lighthouse still stands and in 1856 it was raised from 75 feet to 98 feet.

During World War II the light was extinguished as a security measure, but was again placed in operation on July 2, 1945. The tower is equipped with a 1.8 million candlepower light visible for 16 miles.

The Outer Banks of North Carolina is another area deeply steeped in the history of the United States and its lighthouses. The pirate Edward (Blackbeard) Teach was killed in sight of the Ocracoke Lighthouse and Wilbur and Orville Wright gave birth to today's air age with the help of a lighthouse keeper who fed them and gave the brothers moral support. Among the more than 700 ships wrecked off the Banks are the famed Federal ironclad Monitor and Diamond Shoals Lightship No. 71 that was sunk by a German submarine in World War I.

The Cape Hatteras light sits in the center of the Outer Banks and looks over one of the most violent stretches of

Between marsh and ocean, the Bodie Island light is one of three on the Outer Banks of North Carolina.

Photo by Louis Granger

the nation's coastline. The light warns of the infamous Diamond Shoals which extend out to sea for about 10 miles. In some points the reef comes to within three feet of the surface.

In the days before depth finders and other navigational aids, the Diamond Shoals trapped countless vessels. Some of the broken relics were tossed on beaches and a few can still be seen today.

But it is not so much the extent of Diamond Shoals that make them dangerous as their location. They mark the junction of the warm Gulf Stream flowing north and the cold Arctic waters moving south. When the cool and warm air above these currents mix, a turbulence occurs causing unpredictable and often violent weather.

The Cape Hatteras lighthouse is 208 feet high, tallest in the nation. It is not the original structure completed in 1803, however. The first tower was built of dark sandstone and retained its natural color. Today it has black and white barber pole stripes in contrast to the Cape Lookout light diamond pattern and the horizontal stripes of the light on Bodie (pronounced body) Island about 35 miles north of Cape Hatteras.

The original light was only 90 feet tall and did not provide the warning needed in those hazardous waters. A major problem was illumination. Light from the small lamp fueled by sperm whale oil did not penetrate the darkness beyond the shoals. Storms shattered the windows and broke the lamps putting the light out for days at a time.

In 1851, Navy Lt. David D. Porter said, "Hatteras light, the most important on our coast, is, without doubt, the worst light in the world. Cape Hatteras is the point made by all vessels going south, and also coming from that direction; the current of the Gulf Stream runs so close to the outer point of the shoals that vessels double as close round the breakers as possible, to avoid its influence. The first nine trips I made I never saw Hatteras light at all, though frequently passing in sight of the breakers, and when I did see it, I could not tell it from a steamer's light, excepting that the steamer's lights are much brighter."

The Lighthouse Board in 1852 was determined to improve all lighthouse operations and decided to raise the tower to more than 150 feet and install a new lighting device, a Fresnel lens utilizing prisms and magnifying glasses to intensify a small oilwick flame into a beacon of many thousand candlepower.

Although the Coast Guard owns and operates the lighting equipment, the National Park Service keeps the tower open to the public. Visitors may climb 257 steps to the balcony for a panoramic view of the Graveyard of the Atlantic.

Lighthouse keepers have made their marks in the history of lighthouses. William J. Tate, a member of the Coast Guard and later a North Carolina lighthouse keeper, provided meals for the Wright brothers in their successful flight in a power-driven airplane and Mrs. Tate's sewing machine was used to stitch together the wing fabric of their glider. Because Tate was sympathetic to the flying efforts, some of his friends thought he was "crazier than the Wrights."

The ironclad Monitor was enroute to South Carolina under tow after her historic engagement of Hampton Roads with the Confederate ironclad Virginia. As it rounded Cape Hatteras the wind shifted and freshened to gale force. "The sea rolled high and pitched together in the peculiar manner only seen at Hatteras," said Francis B. Butts, helmsman. "The sea rolled over us as if our vessel were a rock in the ocean only a few inches above the water." The gale sunk the Monitor and 16 of the 65 officers and men died.

Lightships had been stationed off Diamond Shoals since 1824. The first one broke loose in a storm in 1827 and went aground near Ocracoke Inlet. Lightship No. 71, the first to be named Diamond, took its position in 1897 and remained until 1918 when German gunfire sank it. The third, again named Diamond, remained on the shoals until 1967 when a tower-type structure replaced it. The $2 million tower rises 120 feet above the water and has a light visible for 20 miles. The structure is supported by four steel pilings buried more than 200 feet into the ocean floor.

The man-in-the-street's concept of lighthouse keeper's life is that of the hermit, of continued loneliness. But the men and women of the lighthouse service found in those solitudes the kind of lives they sought. Many were fishermen who tired of the hard way of earning a living and deepwater sailors who after a lifetime on the ocean took themselves ashore. In the lighthouse such a man found a happy combination of the cozy anchorage dreamed of during the long watches and wide horizons of the seas.

Many were married and when they died their wives or daughters continued to serve the light. Spinster sisters and aunts who kept house for the keeper learned how to maintain and operate the light and often stayed after his death.

The last woman in the service was Mrs. Harry Salter who kept the Turkey Point light in upper Chesapeake Bay. She retired in 1948 when keeping the light became "too hard on my feet."

One civilian lighthouse keeper remains in service. Frank P. Schubert, 58, started his career in 1937, two years before the Coast Guard took over the navigation aids.

It is possible to become a lighthouse keeper today — possible but improbable, according to Coast Guard personnel spokesmen. There will be keepers for another 10 to 15 years, perhaps longer, until all lights are automated. To become a keeper, a person must first enlist in the Coast Guard. Request for such duty might be granted, but the assignment would be for only up to two years, depending on quarters for dependents. "We don't keep people there any longer than necessary," a spokesman said. "It's rather isolated duty."

Barge Basics

By Jay S. Brown

Breakbulk ships, rapidly disappearing from the seas, are being replaced by highly specialized carriers such as container ships, roll-on, roll-off vessels and barge carriers.

These faster, bigger, modern vessels are economically superior to the conventional freighter because they require fewer port days and less manpower to load and discharge their cargoes. But, the features that make modern ships highly desirable to commercial shipping interests create problems for military logisticians planning for emergency situations.

Most of the highly productive new ships require sophisticated shore facilities such as specialized container cranes, ramps for the roll-on, roll-off ships and space to store containers and barges. In contrast, conventional freighters can be loaded or unloaded by use of shipboard cranes and stevedores available in world ports.

Ways must be found to employ the newer ships under austere conditions in a national emergency when they will be needed to supply military forces in remote areas of the world.

A series of trials held at Coronado, Calif. in 1973 were designed to determine how barge carrying ships, specifically the lighter-aboard-ship or LASH, could be used to support amphibious operations.

The tests were conducted in two phases. The first phase, held in May, was an exploratory development effort, while the second, in September, involved actual operational tests of methods developed in May. The tests were sponsored by the U.S. Marine Corps working with the Naval Facilities Engineering Command. Conducting the tests were members of the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, Calif., assisted by Amphibious Construction Battalion One (ACB-1) which is located at Coronado. The battalion provided amphibious equipment, manpower and a site for the tests.

Military Sealift Command chartered necessary lighters, or barges, from Pacific Far East Lines which operates several LASH vessels. One steel and one fiberglass barge were used in the May phase of the tests and six steel barges in September.

During May, several vessels such as a warping tug (a pontoon causeway section with an A-frame, mooring anchors, anchor winch, quonset hut, and diesel outboard engines), a utility landing craft (LCU), a landing craft medium (LCM), and a 40-foot utility boat were used to determine whether they are suitable for towing barges. Both the warping tug and LCU performed well with the warping tug having an edge because of its greater maneuverability.

Cargo operations conducted in May evaluated adaptability of floating and beached causeways by moving dummy cargo loads from barges either onto the causeway or into other Navy lighterage. Cargoes then were brought ashore by trucks traveling over the causeway, or by beaching the landing craft. Engineers involved gained experience in handling the LASH barges alongside causeways in a mild seaway, and by beaching them.

Lessons learned included identification of a need for more mooring line bitts; better fendering between barges, causeways and towing vehicles; and the need for personnel safety lines on the barges when hatches were open.

The September tests had five objectives. The engineers wanted to evaluate mooring concepts with groups of barges, test hardware developed by NCEL, examine other ways to tow the barges (especially a new "mini-tug"), beach barges for longer periods of time, and to observe interaction between barges and large CH-53 helicopters.

This phase of testing was geared toward learning basic dos and don'ts of barge handling during amphibious support operations. Lessons learned should prevent mistakes during exercise Solid Shield to be held later this year where use of LASH barges has been tentatively scheduled to further evaluate their characteristics.

Mooring barges in clustered block formations showed that they could not be fendered well enough to prevent damage when the barges banged together. However, mooring arrays which allowed strings of barges to stream with the prevailing currents and winds worked well and allowed selection of a single barge for unloading without excessive handling of other barges.

Several types of hardware were developed by NCEL to use in mooring and working the barges. A fairlead was designed so that mooring lines could be run through the barge lifting pins without fraying. These allowed placement of mooring lines in a convenient position near the lifting pins, giving them great accessibility. Mooring bitts also were developed for installation on the

causeways so that the barges could use conventional mooring lines rather than those normally used by the construction battalion.

Small portable bitts were also installed on the barges to allow securing loose ends of mooring lines aboard barges. Loose line ends had been a problem during the first phase of the tests.

A walkway fitted over the side of an open barge allowed personnel to move safely from one end of the barge to another.

All items except the walkway can be quickly installed without special tools. With the use of a small crane, the walkway can be installed in about 15 minutes.

New towing techniques were examined to determine their applicability for handling larger Seabee barges.

CH-53 helo moves a lighter. Test was designed to measure effect of the helo rotor downwash on barges.

Until this phase of the tests, barges had been towed with a 30-foot bridle attached to two lifting pins on the barge. In one test, a barge was towed by one corner attachment. The idea was to determine if an angled barge bow moved through the water easier than the flat front of the barge. In another test while the bridle was hooked at two points, the warping tug's outboard engine propeller thrust was angled away from the flat face of the barge to prevent the wash from adding resistance when the barge was moved.

When the bridle was lengthened to more than 100 feet allowing the tug's propeller thrust to dissipate before reaching the barge, the barge rode the wake of the warping tug. All three methods lowered strain on the bridle from one-third to one-half. In timed runs, towing speed was increased 10 to 20 per cent.

Overall results indicated Seabee barges can be handled by already existing Navy amphibious craft. A new tug, called the mini-tug and fabricated from Navy inventory items also was evaluated. It consisted of a causeway section, about one-third the size of that used for the warping tug, with an outboard diesel engine. It proved to be a highly successful push-and-abreast tow vessel and was more maneuverable than any tug employed.

Its reliability would be even greater if two diesels were used, and the unit would have greater power and more maneuverability. The mini-tug is in essence a power unit for the barge, making it self-propelled.

Barges again were beached during the second phase of the test. This time they were left on the beach overnight rather than just a few minutes. Two barges were beached at high tide, one empty and one loaded. The surf action eroded the beach keeping water under both barges at all times. They were retrieved after high tide without difficulty even though a small sandbar had built up astern of the barges.

Effects of rotor down wash from the large CH-53 helicopters on moored barges were evaluated in the closing stages of the tests. Barges were blown about when adrift or when the anchors were not set properly, indicating that downwash of CH-53 helos probably could be used to move barges if necessary. Helos could also be used to corral barges which break their moorings and are adrift. In previous tests, the smaller CH-46 helicopter could not budge a drifting barge.

The Coronado tests identified both skills and equipment required for handling LASH barges employed in support of amphibious operations in mild sea and weather conditions. However, work remains to be done to become more familiar with the barge carrying ship and its interaction with its barges in amphibious support operations. Also needed are new kinds of fenders and better grouping arrangements. Effects of bad weather on all aspects of operations must be more thoroughly evaluated before the services can determine how to best use the ships which will be available to them in a future emergency.

The most effective way to find answers to the question of how to use barge, container, and roll-on, roll-off ships is by testing them in a realistic environment, as will be done during Solid Shield later this year. Others will be scheduled in future months for it is obvious that the breakbulk ship is not going to continue to be available in the types and numbers needed to support emergency operations.

Cruise of the Golden Bear

By Bill Hayler

The 5th century B.C. Greek historian Thucydides certainly had no vision of the 1974 California Maritime Academy training cruise when he said, "When up to your neck in alligators, it is difficult to remember that the objective is to drain the swamp." But his statement was quite relevant to this year's cruise of the academy's Golden Bear.

The "alligator" in this case was the energy crisis and resulting high price of fuel. Another problem was obtaining necessary clearances in time since the proposed itinerary fluctuated with the ebb and flow of the fuel supply.

Faced with these problems it was necessary to keep in mind that the objective was a cruise that would provide required shipboard training and give the midshipmen experience gained by visiting a variety of world ports.

California Maritime Academy cruises take place between the end of Christmas vacation and the third Friday in March when the Golden Bear returns to her permanent mooring under the Carquinez Bridge at Vallejo. Planning revolves around these two dates.

Before the energy crisis developed, a cruise to the Far East with stops in Guam, Saipan, and Honolulu was laid out and clearances requested. But, when the cost of fuel began to climb, the question arose as to whether fuel would be available in Hong Kong even if the necessary funds were available.

As is true with all state academies, California operates on a tight budget. Approximately $65,000 set aside for fuel would have been more than adequate for the planned consumption of 13,000 barrels at $4 a barrel paid the previous year. However, higher fuel costs made it clear that the academy could not afford 13,000 barrels even if a seller were found.

On the first bid for fuel there were no takers. The oil companies had their hands full satisfying steady customers—which California Maritime Academy was not.

Finally, a group of oil companies made 6,900 barrels available at $7.60 per barrel. The way costs were rising, this was a fair price. It would satisfy our requirements for a curtailed cruise provided the ship spent more than the normally allotted time in port.

In late December, change number nine to the itinerary was made and ultimately was the version we followed.

The Golden Bear sailed from Vallejo January 23 and made stops at Long Beach, San Diego, Acapulco, Mazatlan, Maui, Honolulu, Seattle, and Portland before returning home.

Although the Far East will have to wait for another time, the visits to Seattle and Portland were highly productive from the viewpoint of recruiting and public relations. There may be a lot of rain in the Northwest, but it did not dampen the enthusiasm with which the midshipmen were welcomed in Seattle and Portland.

Reduced speeds meant a fuel savings as well as an increased opportunity for more man-overboard and maneuvering drills. Although the midshipmen were not downcast because of the increased in-port time there was admittedly less time for navigation and sea training than is the custom on academy cruises.

This was the first cruise where the planners had to take into account an oil shortage, and the first cruise when midshipwomen went to sea.

A recent change in California law had opened the academy to women.

The midshipwomen did well. Two bunk rooms were set aside for the five women, and their occupants made them homey in true sailor fashion with the help of large quantities of soap, paint, enthusiasm, and elbow grease.

They stood watch with their fellow midshipmen and received no special consideration. At the end of working hours they also had paint on their coveralls, grime on their hands, and

an occasional broken fingernail. They received far more publicity than their male counterparts, because they were obviously news. Although this caused some second thoughts on the part of some male chauvinists, most felt that the academy benefited from the press exposure.

A final example of how planning blends with execution, and how both can come uncomfortably close to the wire, occurred in the fitting of new engines into the Golden Bear's two liberty boats, Usually there is at least one port on each cruise where the Bear must anchor out, and Acapulco was it. Consequently, the non-arrival of the two new Deutz three-cylinder engines for the boats caused some anxiety.

Finally, they arrived far behind schedule. The engines were being fitted into their foundations as the ship departed Vallejo and shafts remachined to fit the new engines as the ship left Long Beach.

In San Diego it was discovered that both engines were made for left-turning propellers and we had none. Visions of boats backing into the liberty landing or midshipmen manning the paddles loomed large. Rising to the occasion was Jimmy Nagle, an engineering storekeeper and retired Navy machinist mate who just happened to scavenge some boat propellers from the old Golden Bear (*Three Lives of the Golden Bear*—Sealift, January 1973) before she was towed away to be cut up into razor blades. With a little lathe work, they fit. And they were left-turning!

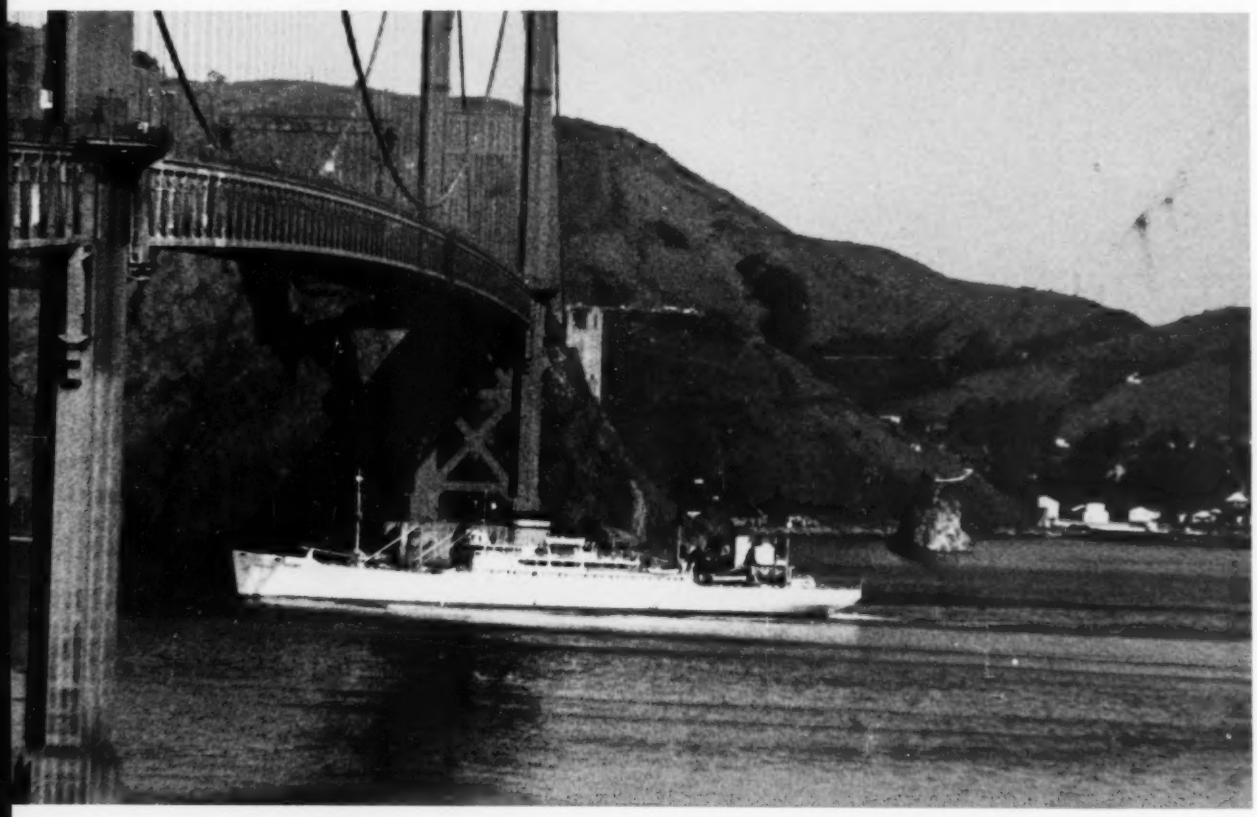
After taming the oil alligator and getting the liberty boats back in commission, the cruise went smoothly.

Acapulco was, to our dismay, geared to the affluent tourist, but Mazatlan was delightful and provided an opportunity to meet midshipmen from one of the Mexican maritime academies. Unfortunately, the quest for oil in Mazatlan was unsuccessful. The price had shot up to $25 a barrel.

Maui with its little harbor of Kahului and the old whaling port of Lahaina were favorites. In spite of all the new steel, concrete and glass buildings, Oahu has not lost its magic although some old-timers aboard had difficulty in spotting the Aloha Tower. In Seattle and Portland the red carpet was rolled out to all the ship's company. Visitor records reached a new high, and it was impossible to keep "welcome aboard" folders on the quarterdeck.

The 1974 cruise started out with more than its share of difficulties but wound up a success.

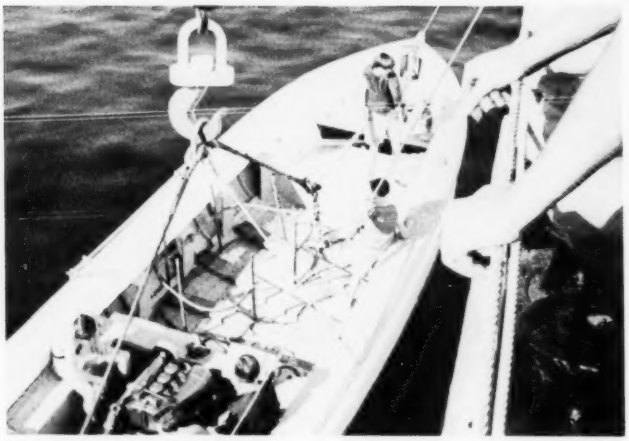
*Golden Bear passes under the Golden Gate bridge at start of the cruise. Known as USS Crescent City during World War II, she passed under the bridge hundreds of times carrying combat-ready Marines bound to the Western Pacific. (See Sealift, January, 1973. **Three Lives of the Golden Bear.**)*



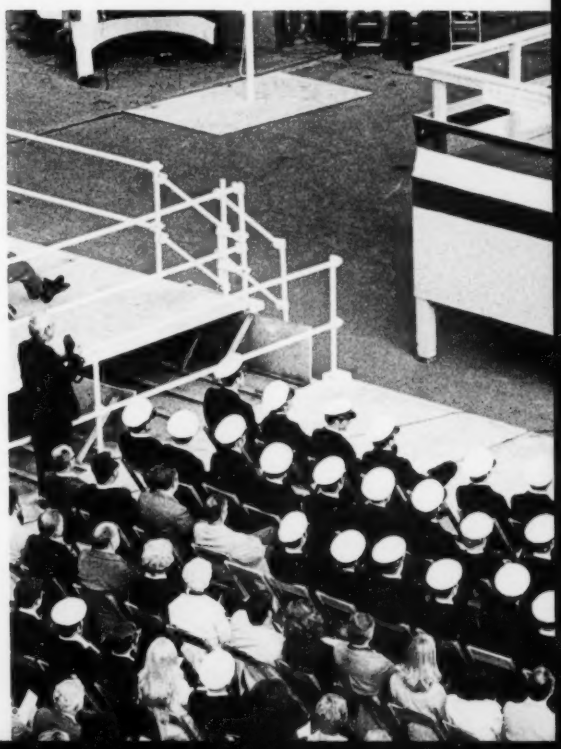
Cruise of the Golden Bear

Golden Bear arrives at Kahului, Maui where she was met by wives and girl-friends of midshipmen and crew.

New Columbia River pilot boat can operate in anything short of a hurricane. The small pilot boat is taken aboard mother-ship when not in use.



Midshipmen lower a launch.



Captain Aguilar inspects midshipmen —and a midshipwoman. Sue Buller was one of five midshipwomen who made the cruise on Golden Bear.

Home at last!

Midshipmen had front row seats at the launching of Sealift Arabian Sea at Todd Shipyard in San Pedro.

Todd Shipyards

140 Years of Shipbuilding

By Linda McDaniel

During the winter of 1862 reports of an awesome, iron-clad Confederate warship often were heard in Washington. Rumor had it that the warship was so deadly it could sail up the Potomac River and destroy the Capital along with other waterfront cities.

On March 8 the ungainly-looking ship, fitted with four-inch iron plates and a cast-iron ram, sailed from her anchorage at Hampton Roads, Va. to battle Union ships blockading the mouth of the James River. She was the warship Merrimack refitted by the Confederates and renamed the Virginia. The warship soon proved there was some substance to the rumors. The Virginia quickly destroyed the Union ships Cumberland and Congress, and forced the frigate Minnesota to run aground.

At sunrise the next day, Virginia met her match, the Union ship Monitor, an armor-hulled warship fitted with the first revolving gun turret.

It is well known that the first battle of the ironclads ended in a stalemate. However, few people realize that Todd Shipyards Corp., developed from a series of alliances which began when John Ericsson and Cornelius DeLameter, were given a contract to build the Monitor.

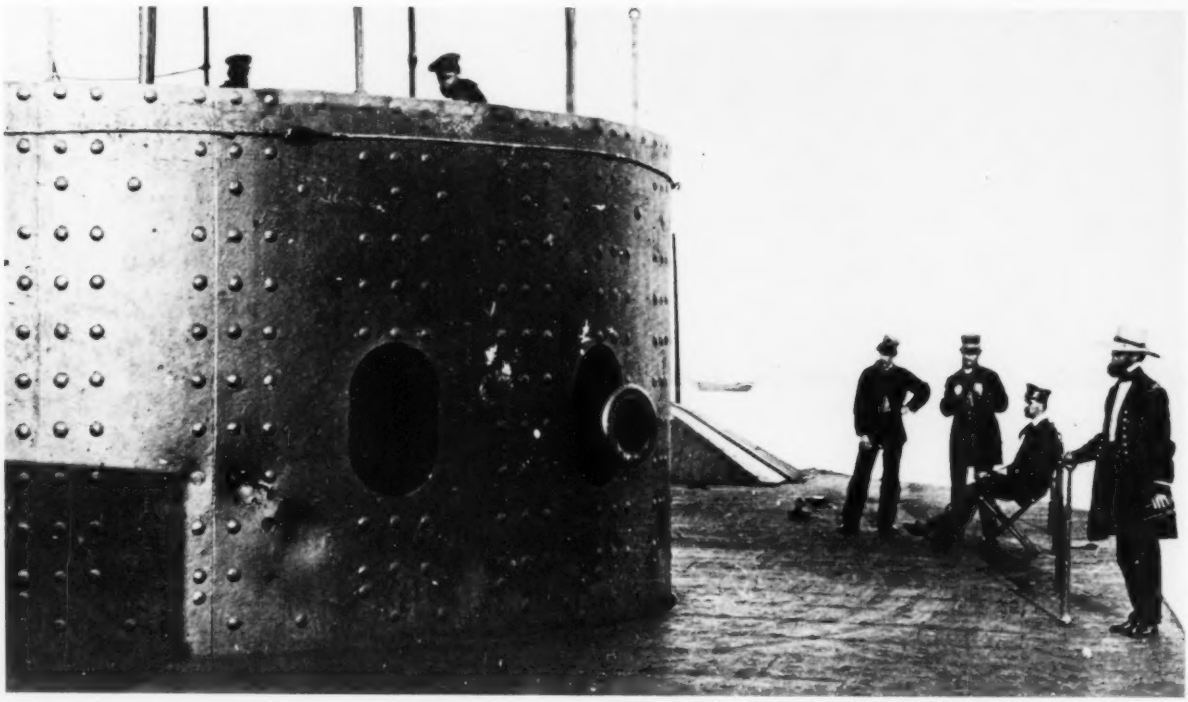
Ericsson, a noted Swedish naval architect, designed the Monitor, and DeLameter Iron Works built the engines and propeller. It is from this company, founded by William DeLameter in 1835, that origins of Todd Shipyards Corp. can be traced.

Both Todd Shipyards Corp. and the shipbuilding industry have come a long way since that early-morning confrontation. The corporation currently has a $300 million construction order backlog for ships, most of them steel-hulled vessels.

Included are an air cushioned amphibious assault landing craft, and a drilling ship—both multi-million dollar vessels so sophisticated that they belie the corporation's humble beginnings.

Originally located in Manhattan, N.Y., DeLameter Iron Works was moved to Erie Basin in Brooklyn in 1889, after DeLameter's son-in-law, John N. Robins,

Officers on deck of Monitor.



took over the business.

Through acquisition of properties, and changes in management and corporate structure, the firm became Erie Basin Dry Dock Co. At that time the yard had five drydocks and a well-equipped machine shop.

Not long afterwards, Robins hired William H.Todd to help manage the rapidly expanding organization. An energetic young man, Todd had gotten his start in the shipbuilding industry as an apprentice boilermaker with Pusey & Jones Shipyard in Wilmington, Del.

In 1904 Todd became vice president of the company, then called Robins Dry Dock and Repair Co. He was elected president when John Robins retired in 1909.

Todd and several associates bought Robins Dry Dock and Repair Co. in 1915 and formed the William H. Todd Corp. a year later. By that time the corporation also had acquired the Tietjen & Lang Dry Dock Co. of Hoboken, N.J., and Seattle Construction and Dry Dock Co. of Seattle, Wash. A few months later, Todd took over the Tebo Yacht Basin in Brooklyn, N.Y.

Even before the United States entered World War I in 1917, American merchants were finding it difficult to get ships to move their products. European shippers, already embroiled in the conflict, were unable to provide shipping service for American merchants. They were, in fact, also in great need of ships to meet war supply needs.

Responding to increasing demands for new ships, Todd built a yard in Tacoma, Wash. This yard produced more than 67,000 tons of merchant shipping by 1916, building more than 50 ships before the war ended.

Todd not only built new ships, but also earned a reputation for performing difficult ship conversions and major repair jobs. Operating its plants 24 hours a day, Todd production was such that its ships made up almost 90 per cent of the first convoy of the war.

At the end of the World War I, Todd had more than 18,000 people on its payroll and was operating five plants on the Atlantic Coast and two on the Pacific Coast.

Shipbuilding slowed after the war, and contracts were scarce, eventually causing Todd to reduce its work force to 2,000 employees. Todd did, however, receive several Navy contracts.

One provided for building of three scout cruisers. The first completed, the Omaha, was launched in December 1920. Milwaukee was launched in March 1921, and Cincinnati in May of the same year. These ships were the first of their kind to be constructed for the U.S. Navy, and the first ships to be launched bow-first.

In 1921 Todd converted USS Wright, the forerunner of the aircraft carriers. Originally a transport built in the Federal Shipping Board's Hog Island shipyard, Wright was reconfigured to handle balloons at sea. Balloons were used for reconnaissance by commanders of battleship squadrons.

A man of foresight, William Todd identified two coming trends long before the end of the war. First was an obvious reduction in shipbuilding and ship repair contracts. He also anticipated the transition from coal to

Artist's rendering of amphibious assault craft under construction at Tacoma, Wash. for the Marine Corps.

oil burning equipment by both domestic and industrial users.

That led to his decision to add a products division by including the White Fuel Oil Engineering Co. in the corporate structure of William H. Todd Corp. in 1916, a move which enabled Todd to ride out the austere period which followed the war and a subsequent depression. The fuel oil engineering function was part of Todd until 1969, when it was sold.

Shortly after William Todd's death, John D. Reilly became president of the firm. That was in May 1932. He immediately began to enlarge the organization.

In September 1934 Reilly decided to open a Todd tanker repair yard in Galveston, Texas at Pelican Island. Although many tankers were handled by Todd's Brooklyn and Mobile shipyards, the Pelican Island site was ideal in terms of water frontage and tanker traffic. That shipyard now makes up the Galveston division of Todd.

After passage of the 1936 Merchant Marine Act, which rejuvenated U.S. shipbuilding, Todd received a contract to build five twin-engine cargo motor ships. The work enabled Todd to reopen the Seattle-Tacoma Shipbuilding Corp. yard at Puget Sound. A new yard was built on the same site where the company had pioneered mass production methods during the first World War.

USNS Hayes moves down the ways July 1970 at Todd Shipyards Seattle.

Destroyer escort USS Knox on launching day.

Before the five motor ships were launched, Navy asked Todd to begin a crash destroyer-building program. That order came in 1941 and another new yard was opened in Seattle.

From then on contracts streamed in for ship construction, conversion, and repair as the United States began to enlarge and strengthen its fleets in preparation for World War II.

Todd received a contract from the British Purchasing Commission for 60 large cargo vessels. The order was split up and 30 ships, forerunners of the Liberty ships, were built in Atlantic Coast and 30 in Pacific Coast yards.

Todd also received shipbuilding contracts from the Navy and U.S. Maritime Commission.

Among them was an order for 350 LCIs (Landing Craft, Infantry). In 1943 Todd built a plant in Barber, N.J. to construct LCIs using the most technologically advanced production methods then known.

In the same year the Navy Department asked Todd to manage a plant at San Pedro, Calif. which had been taken over by the government. In November 1946 Todd acquired title to the plant and has since operated it as the corporation's Los Angeles division.

At the close of World War II, Todd employed nearly 57,000 people and had built more than 1,000 ocean-going vessels, repairing or converting another 23,000. In recognition of these feats, Todd was given 33 awards by various branches of the armed forces.

Todd's outstanding World War II achievements have been followed by significant peacetime achievements which have allowed the organization to greatly expand its facilities.

Headed by John T. Gilbride, Todd now has seven marine divisions and a research and technical division. The marine divisions operate yards in Brooklyn, New Orleans, Galveston, Houston, Los Angeles, San Francisco, and Seattle.

Among recent projects was Todd Brooklyn division's work on USNS Short Splice and USNS Col. William J. O'Brien for the Military Sealift Command in 1955. The two ships were converted into heavy-lift ships and equipped with 80-ton lifting booms and 10-ton cargo handling gear.

Three years later, Todd's Los Angeles division converted USS Paul Revere for the Navy. Originally a cargo vessel, it became the Navy's largest and fastest attack transport.

Constructed in 1944 by Todd Houston, Thomas Eakins in Baltimore, 1947.

In November 1960, Todd Houston completed construction of the barge Atomic Servant. Built to service the nuclear powered merchant ship NS Savannah, she now is used for maintenance, refueling, and waste handling operations for Navy nuclear powered ships.

In the early 1960s, Todd also became involved in space projects, building the "space barge" Palaemon and converting the Promise. The two vessels were used to carry Saturn boosters to the Cape Canaveral, Fla. launching center from the George C. Marshall Flight Center at Huntsville, Ala.

In 1969 Todd's Seattle plant built the oceanographic research ship USNS Hayes for operation by Military Sealift Command. A catamaran, Hayes is a unique oceanographic vessel not only because of hull configuration, but also because of its propulsion system and automated ship handling equipment.

Two years ago Todd Brooklyn division repaired the I.O.S. 3301, a barge owned by Irgram Ocean Systems. While preparing to sail from Port Jefferson, N.Y. the barge broke in two. The barge was put back in service in less than 17 weeks, after an extensive repair job.

Last year Todd's San Pedro division launched USNS Sealift Pacific, first of nine 25,000-deadweight-ton tankers to be completed under a Military Sealift Command build and charter program. Sealift Pacific was delivered for MSC operation in August.

Three others, Sealift Arabian Sea, Sealift China Sea and Sealift Indian Ocean were launched this year, and all are to be delivered by the end of the year.

Future plans for Todd include expanding and upgrading its facilities. Construction is under way to extend and widen shipways to accommodate ships up to 120,000-deadweight-tons. Heavy-lift capability will be increased to allow shoreside construction and placement of larger ship modules. Facilities will also be rearranged to permit building and repairing of barges and small craft expected to be in great demand when Alaskan oil becomes available.

"These and other facility improvements," said Gilbride, "are in contemplation of an expected continuation of increased opportunities in both shipbuilding and ship repair."

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Todd-built Henry D. Lindsey anchored at Baltimore in September 1946.

Photo by Norton Crockett

Operation Cool Barge

By Lt. Donald J. Curran Jr.

Bordered by the Bering Sea on the north and the vast Pacific Ocean on the south, lonely, desolate Shemya Island Air Base is one of more than 40 U.S. government defense and communication sites located in Alaska and the far northwest.

From these outposts on America's last frontier, military men and scientists are able to maintain their activities because of the support of Military Sealift Command's Cool Barge Pacer Alaska program. This operation supplies the outposts with food, machinery, oil, gas, jet fuel, autos, trucks, electronic equipment and hundreds of other items taken for granted at installations within the Continental United States.

Most Alaskan sites are completely inaccessible by rail or road. Aircraft ferry personnel in and out, but the tremendous bulk of the supplies brought to the outposts must be delivered by sea. Unfortunately, the remote Distant Early Warning (DEW Line) sites, National Weather Service posts, Air Force installations and communication stations are frozen in by ice from November through April each year. During May to October, MSC ships thousands of tons of food and equipment to the sites.

At its inception in 1951, the resupply operation was a responsibility of the Navy—with MSC providing some ships. In 1957, U.S. Army Alaskan Command assumed responsibility for the operation and conducted the resupply effort until January 1964.

At that time, MSC took over the resupply mission. To deliver the goods, MSC awarded a five-year contract to Alaska Puget United Transportation Companies (APUTCO) for $14.3 million.

That contract ended in 1969 and the resupply operation was named Cool Barge. APUTCO was awarded another contract, this time for four years, in March 1970 for a fixed price of $18,125,000.

Though the operation is simple in theory, it takes a great deal of skill, ingenuity and courage to deliver cargo in ice strewn waters where few ports exist. Constantly developing new ways of delivering their cargo, APUTCO engineers describe the operation as "innovation through improvisation."

Four combination dry cargo and petroleum barges and one oil barge are loaded in Seattle and towed by ocean-going tugs up the Alaskan Panhandle and across the Gulf of Alaska to begin the five-month task of delivering the vital supplies.

The barges usually carry about 6,000 tons—4,000 tons of dry cargo and 2,000 tons of petroleum.

All cargo is specially marked and loadmasters plan where each piece is to go aboard the barges. The last cargo on will be the first cargo off and a crate inadvertently placed below crates going to a more distant site means trouble. The time used to dig it out is wasted time.

In 1973, a total of 96,924 tons of cargo was delivered by Cool Barge. Deliveries were made from southeastern Alaska to Point Barrow on the north slope. During the off-season, old forklift and handling equipment is almost completely rebuilt by APUTCO machinists, so virtually new equipment is delivered to Cool Barge sites each year. All petroleum hoses are checked and re-checked inch by inch by blowing thousands of gallons of water throught them to catch any leaks. Oil spills would lose not only precious cargo, but wreak havoc in the delicately balanced Alaskan environment.

There are only two ports along the Cool Barge route which can accommodate the giant barges at a pier, so discharging cargo requires typical Yankee ingenuity. Barges must anchor offshore anywhere from 500 yards to 13 miles at most ports of call.

Lighterage barges and self-propelled lighter-tugs are carried aboard the larger barges and are used to run cargo through the shallow waters off the Alaskan coast. Huge shipboard cranes transfer cargo directly onto the lighters or on flatbed trucks aboard the lighter which are taken to the beach where they are driven to their destination, from 50 feet to 15 miles away.

APUTCO's twin engined Bonanza.

At one Cool Barge delivery site, the stern of a lighter is lashed flush to the side of the barge and the bow is lowered onto the beach making the lighter a portable pier where trucks roll on and off carrying cargo.

At Bethel National Weather Service Station the barge can come no closer to shore than a sandspit which stretches a few hundred yards out to sea. Each year a plow carried aboard the barge is used to fashion a road built of sand to the height of the barge deck. Trucks are backed up the road and loaded with cargo for delivery. One unique feature of Cool Barge is that the tug and barge crews also handle the unloading—and operate all the equipment used.

Two distant sites require 440-mile trips along inland rivers by the lighter tugs. Often the river is less than four feet deep and the navigation of the channel is always a challenge to the APUTCO lighter-tug skippers.

At the Point Lay DEW Line site, 1¼ miles of hose is laid across a sandspit, a lagoon and up a mountain to deliver thousands of gallons of heating oil and motor gas. Each year as the sea encroaches on the land, or the land encroaches on the sea, a new set of problems faces the APUTCO innovators.

Rear Admiral John D. Chase and I had an opportunity to visit a Cool Barge site on a recent visit to Alaska and met some of the men who make the whole thing work.

We rose at 3 a.m. to catch a 5 a.m. flight to Bethel, Alaska, roughly 450 miles west of Anchorage. During the summer there, at 3 a.m. it is broad daylight. At first it really throws you and I'm not sure I could ever get used to the "land of the midnight sun" as a way of life.

Cargo is unloaded at a DEW Line radar site along the northern coast of Alaska.

The plane was a Boeing 737 which carried more general cargo than passengers—another twist common in Alaskan transportation economics.

When we arrived at Bethel, the plane touched down in the rain and skidded to a hair-raising halt. I learned later that Bethel has the third largest airport in the state of Alaska, even though it still has a log cabin for a terminal. It's a whole different world in the wilds of Alaska, and you can't help but admire the stamina and spirit of the people who are part of the land.

We were met by Lee Jenkins, chief pilot for APUTCO. Lee has been involved with Alaska since 1941 and knows it as well as anyone. He welcomed the admiral, Cmdr. Bill McHenry, commanding officer of our office in Anchorage, and myself, then took us out to what he has fondly dubbed "Hirohito's Revenge."

It was a Toyota Corrolla of questionable material condition. The car had the appearance of having been used as an underwater obstacle at the D-Day Normandy invasion some 30 years ago. We all piled in and much to my chagrin I discovered that the driver's seat was set permanently in the recline position so that the knees of the passenger in the back seat are crushed beyond hope.

Two combination dry cargo and petroleum barges on their way to Alaska from Seattle. Tug is off-camera.

Loaded APUTCO trucks roll off a lighter at a Cool Barge site.

We rumbled out to the barge site which was active even at 7 a.m. The tug Sea Wolf was tied up to a mother barge and rocked gently in the Kuskokwim River.

Capt. John Webb greeted us and we made our way to the galley. The crew was just sitting down to breakfast and we adjourned to the bridge. Captain Webb mentioned the whims of the weather and its effect on this year's operation. It seems the Kuskokwim was low due to low rainfall and a scarcity of snow this year. Some deliveries up the river had been delayed because of this and had added a month to the operating period for 1974.

These sentiments were echoed by Bill O'Shea, APUTCO's Cool Barge operational manager. Bill has been on this run since 1964 and is an old hand at wrestling with Alaskan weather.

After a hearty breakfast, we drove to Bethel airport and boarded APUTCO's twin Bonanza aircraft for a trip to Tatalina, a remote Air Force site near McGrath, Alaska. We followed the river until just before Antiak, at which time we had to climb to 8,000 feet to avoid marriage to the local mountain range.

After a 60-minute flight we were approaching Tatalina. The airstrip is a gravel area which can accommodate only small planes. We were greeted by the executive officer of the base who gave us a rundown on local operations. We departed as quickly as we had come with one minor change. Lee taxied the Bonanza down the runway before taking off to remove any stray animals which might have wandered into our path.

Once airborne, we flew over Sterling Landing, the area where trucks are loaded for a long 16-mile trek up a winding road to Tatalina. Lee then overflew one of the highway barges which had run aground. Its cargo was being transferred to a smaller barge. Bill O'Shea had a few choice, but deleted expletives to describe the situation.

We had hoped to make a trip to Newen, another Cool Barge site, but Lee scratched the flight because of 35 knot crosswinds on the runway. We respected his judgement and took a tour of the Bethel area instead.

Cool Barge is a unique operation, manned by unique individuals in a very unique area. The work is hard, the hours are long and rewards are small. Amazingly, each man on the job is cross-trained and can do just about anything he is called upon to do.

When he's not flying, Lee Jenkins can pump gas, operate a crane, drive a dump truck, work on an engine or take over for the cook. The same can be said for Bill O'Shea, his son Mike, John Webb and most of the other Bunyonesque characters who make Cool Barge a success.

Pins and Needles at Sea

By Howard L. Rosenberg

For hundreds of years seamen considered having women aboard ships tempting bad luck. But, the merchant seamen who sailed with Vivian Richardson for 21 years do not subscribe to that myth.

A native of Rocky Mount, N.C., Vivian Richardson got her merchant seaman papers in 1946 and haunted the halls of the National Maritime Union and the crewing office of Military Sealift Command, Atlantic for seven years trying to ship out. Finally, someone became ill on an MSC vessel and she signed on for one cruise in 1953. A year later, she got another cruise, and then sailed continuously until 1971.

She worked in the steward's department from 1953 to 1963 on several MSC ships including Patch, Rose, Upshur, Geiger and Gibbons. After leaving MSC, she worked on commercial ships and while aboard the Grace Lines' Santa Rosa met, fell in love with, and married the ship's boatswain.

She sailed aboard Santa Rosa for seven years. In 1969, her husband was badly hurt in a shipboard accident and was disabled. Mrs. Richardson continued sailing until 1971, when, "shipping was so slow, I decided to take off for awhile and spend more time with my husband."

She went to work for the Ebony Fashion Show Theater, using her talent as a seamstress to design and remake fashions for the models. "It was a hectic life," she said, "we would hit 83 cities in 90 days from New York to the Virgin Islands to California."

After her husband died in 1972, she continued to work in the fashion world. Finally, last February, she decided to go back to sea. "I don't know what made me go to sea in the first place," Mrs. Richardson mused, "It's just something I always wanted to do when I was a child."

"I've been all over the world except the Orient, and I intend to make it there before I quit."

"I always keep busy at sea. I sew and do needlework, make alterations for the men aboard or patch torn clothing. I've never had a time when I was bored and I've never been seasick."

Mrs. Richardson does crewel needlework, creating everything from intricate flower arrangements to farm scenes. "My favorites are scenes with children in them." In her travels she has picked up the culture and designs of the countries she visited and is about to develop a creation of colored strings and nails, a technique she learned while in port at Durban, South Africa earlier this year.

"It's very important for a seaman to have some kind of a hobby or a second occupation. Then, his off duty hours can be enjoyable, educational and rewarding," Mrs. Richardson said. "It is surprising what can be done with plastic containers, packing foam and other waste materials. For the deck department men, who are expert knot tyers, belts and rugs can be tied using various knots and made into useful and beautiful items."

In 1961, Otho Hicks, director of the United Seamen's Club, sponsored a luncheon honoring Mrs. Richardson. She received a letter of commendation for her work at the Seamen's Clubs in Bremerhaven, Germany and Naples, Italy, helping to establish a fund for seamen left behind after hospitalization in foreign ports. "Many were left in hospitals overseas without enough money even to buy a soft drink or cup of coffee. That's why the fund was established," she said. "Now Seamen's Clubs have cash on hand to help out stranded seamen."

Mrs. Richardson was also the first woman in the port of New York to earn a lifeboat certification from the U.S. Coast Guard.

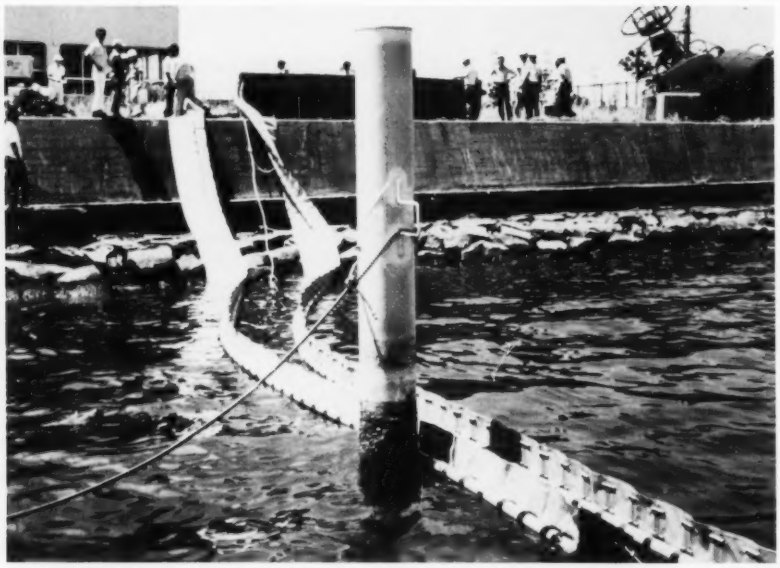
She is now sailing aboard the Mormac Pride owned by Moore McCormack Lines. The ship makes coastal runs and then back and forth to East and South Africa.

Mrs. Richardson's looks belie her 57 years. Last month, while trying to vote, she had trouble identifying herself. "The woman looked at the records and refused to believe I was 57, I had to pull out all kinds of identification and she said I looked 15 years younger. My mother, a retired teacher, is 80 and my father is 83 and looks 63."

"They have always been wonderful parents and always went along with whatever I wanted to do. When I shipped out, my father gave me one piece of advice. He said, 'Never be less than a lady.' I have always tried to do just as he said."

Fencing in Oil Spills

Submersible oil fence used in Okinawa. It stretches 4,350 feet.



Oil containing fence is sunk by bleeding off air and surfaced by inflation.

By Linda McDaniel

A submersible "oil fence" which may be more effective than conventional booms in containing oil spills has been developed by a Japanese firm.

Designed and built by Bridgestone Tire Co. of Japan, the oil fence consists of a flexible rubber skirt supported by two air-filled hoses. The skirt extends above and below the water surface. Rigidity is maintained by fiberglass rods placed at 10-inch intervals. The fence rests on the ocean bottom when not in use and is floated into position around a ship berth when needed.

It is anchored to the harbor floor by cement blocks and encircles a berthing facility. The fence may be sunk in 10 to 30 minutes by partially deflating the hoses. Refloating is accomplished by injecting air and can be done in 20 to 30 minutes, depending on the depth of water and the air-compressor output.

The design was perfected after months of prototype testing in various weather and sea conditions. Tests proved the device could contain surface oil during severe

weather conditions and rough seas. The fence also was found to be extremely durable and easy to handle.

During tests in many types of seas, the fence rode out waves smoothly without allowing oil to escape. Flexibility is gained by extending the skirts 10 feet beyond the hose length.

The production model of the fence has 65½-foot sections with twin flotation elements attached. Each flotation hose is capable of independently supporting the fence. The standard model fence extends 1½ feet above and almost 2 feet below the surface, using a 4.9-inch diameter hose weighing 6,500 pounds. Both fence and hose are made of a special compound of natural and synthetic rubber which has been treated to resist impact of oil, fire and weather.

Lord Kinematics, an operating unit of Lord Corp., an engineering firm with headquarters in Erie, Pa., will market the oil fence in the United States.

Several oil fences already are in use. The largest has been installed in Okinawa where Gulf Asian Terminal, Inc. is using one 4,350 feet in length.

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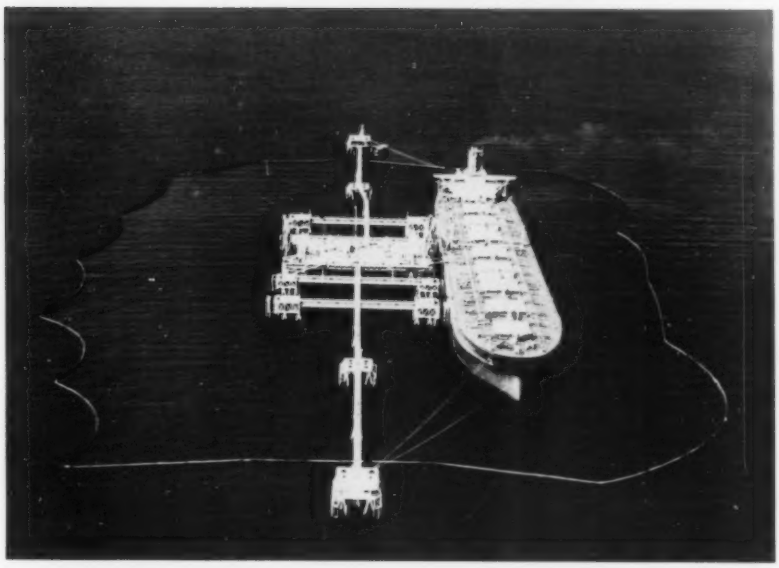
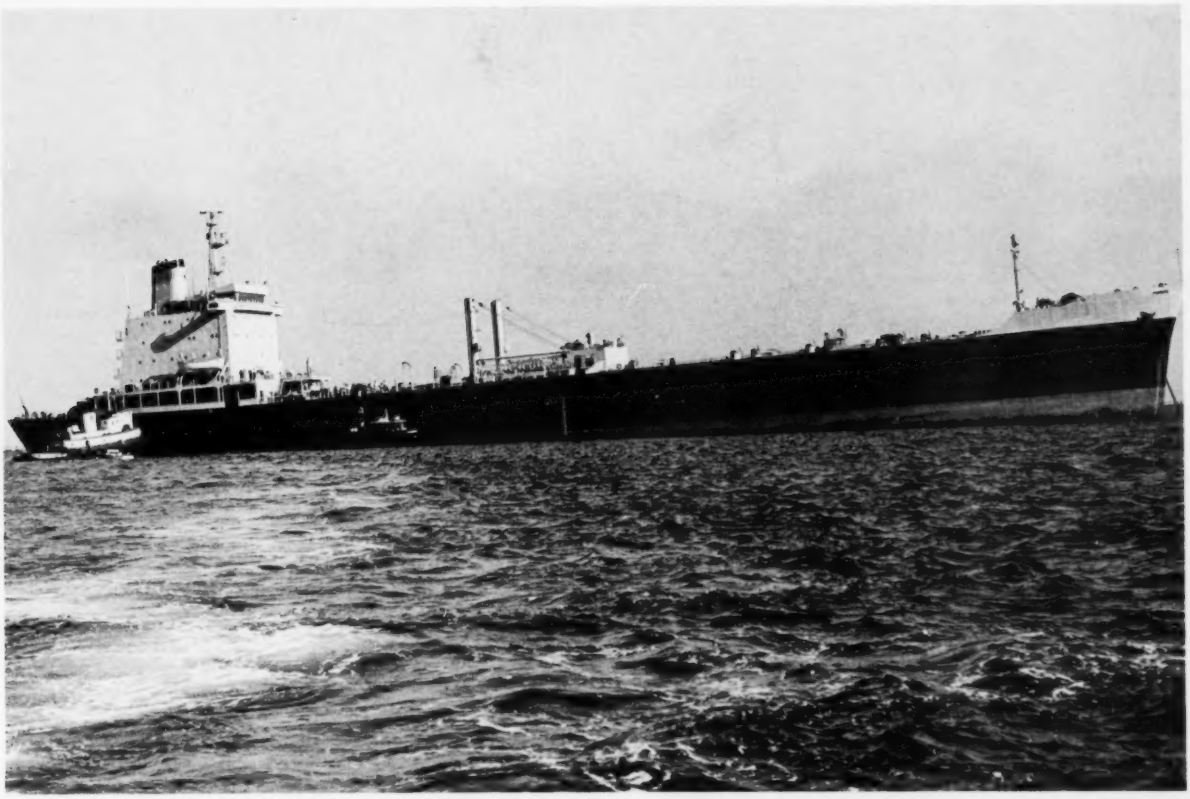
Oil fence surrounds super tanker berth in Okinawa. Spillage is contained by the fence and piped off.



Wave-riding ability of the submersible fence is one key to its efficient containment of accidentally spilled oil.



USNS Sealift Pacific, anchored off San Pedro, Calif., ready for her second series of sea trials. The first of nine 25,000-deadweight-ton tankers constructed under the Navy's build-and-charter program, she went into service in mid-August serving worldwide Department of Defense sites.

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